

## **REMARKS**

This is in response to the Final Office Action mailed on April 27, 2009 in which claims 1-4, 6, 8, 9 and 11-21 were rejected, and claims 5 and 7 were indicated as being allowable if re-written in independent form.

### **I. REQUEST FOR ENTRY OF AMENDMENTS**

Claims 5 and 7 were indicated as being directed to allowable subject matter.

However, claims 5 and 7 contain complex equations. The scope of Applicant's invention is not limited to specific equations. Therefore, Applicant proposes to re-write the independent claims to include steps generally corresponding to these equations in a literal way (so as to complete claims 4 and 6 with a step for each equation) and to specify for each independent claim, that a reconstruction phase shift D is taken into account.

Specifically, allowable claim 5 depends from independent claim 1 through intermediate claim 4. Accordingly, claim 1 is cancelled and incorporated into claim 4, which is re-written to include a step for each equation in claim 5.

Similarly, allowable claim 7 depends from independent claim 15 through intermediate claim 6. Accordingly, claim 15 is cancelled and incorporated into claim 6, which is re-written to include a step for each equation in claim 7.

Since Applicant believes the proposed amendments generally correspond to subject matter indicated as being allowable by the Examiner (however not in equation form), Applicant requests that these amendments be entered to place the application in condition for allowance.

### **II. CLAIM REJECTIONS – 35 USC § 103**

Claims 1-4, 6, 12, 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kober et al. U.S. Patent No. 6,252,535.

Claims 9, 11, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kober et al. in view of Applicant's Admitted Prior Art (AAPA).

#### **A. Summary of Previous Office Actions**

1. The present application discloses a BFDM/OM modulation and demodulation technique, based on the implementation of a transmultiplexer structure. This transmultiplexer

structure is composed of a bank of synthesis filters (in a modulation step) or a bank of analysis filters (in a demodulation step) having  $2M$  parallel branches. Each branch of the banks of filters comprises an expander, respectively, a decimator of order  $M$ .

An essential aspect of the invention recited in the independent claims is the ratio between the number of branches of the banks of filters ( $2M$ ) and the order of decimator or expander ( $M$ ).

2. In the second Office Action, the Examiner cited a new document (KOBER) as allegedly disclosing and/or making obvious most of Applicant's claims, by ignoring the essential aspect of the ratio  $M/2M$ .

3. In the third Office Action, the Examiner maintained his position, and relies again on lines 34-50, column 5 of the KOBER document, to suggest that KOBER describes an order of decimation  $M$  ("M-fold decimation"), by carrying out a downsampling, and that it would be obvious to adapt the sampling order to another value than  $M$ , according to the needs of the user.

In Applicant's response, Applicant explained that the objective of KOBER is to obtain CNA and CAN, compromising speed/precision as much as possible (col. 1, lines 60 to 65). To decompose the signal into sub-bands allows it to be on a weaker flow in every subband, the point being to work on critical decimation.

If he chooses a number of parallel branches ( $N$ ) as the double of the factor of the expander ( $M$ ), he doubles the speed of processing with regard to the critical case, which goes against his objectives.

In addition :

- Nothing in KOBER suggests the use a factor of decimator/expander different to the number of branches;
- On the contrary, all the explanations and equations (notably, the square matrices) are specific to the case  $N = M$ ;
- Choosing  $N \neq M$  goes against the objectives of KOBER, and is not suggested;
- Besides, the particular case  $N = 2M$  of the invention is not suggested.

#### B. Content of The Final Office Action

1. In this final Office Action, the Examiner indicates having taken into account Applicant's arguments, but considers that, nevertheless, KOBER would put into question the inventive step of claim 1, as well as most of the dependent claims.

2. The Examiner answers shortly to the Applicant's arguments, and relies again on lines 34-50, column 5 of the K Ober document, to suggest that this paragraph describes an order of decimation M ("M fold decimation"), by carrying out a down-sampling, and states again that it would be obvious to adapt the sampling order to another value than M, according to the needs of the user.

As already stated in the previous Office Action, he confirms that claims 5 and 7, which claimed specific equations defining signals having the features of claims 1 to 4, are directed to patentable subject matter.

### C. Comments and Amended Claims

1. As in the previous Office Action, the Applicant does not agree with the Examiner.

Applicant considers that K Ober discloses clearly and solely that the number of branches must be equal to the factor of decimation or expansion (M). As a result Applicant considers that K Ober belongs to the state of the art as the present application mentions (page 4 lines 19-25 of the WO publication):

"Indeed, known schemes of transmultiplexers have decimation-expansion factors more than or equal to the number of implemented sub-bands. On the other hand, with the approach of the invention consisting of implementing on each of the branches of the filter banks, filtering means derived from a predetermined prototype modulation function, a number of sub-bands may be obtained which is larger than (double) the expansion and decimation factor."

In addition, the Applicant reminds the Examiner that choosing the factor of decimator and expander so that it is different from the number of branches (M), is not obvious and requires an inventive step. And, the particular case of the invention N=2M doubling the speed of processing would go against the objectives of K Ober, which aims at compromising speed/precision.

2. As this is a Final Office Action, we propose to modify claim 1, based on the statement of the Examiner that claims 5 and 7 are directed to patentable subject matter.

For example, the links of the new amended claim 4 with the example equations of claim 5 and figure 5 (respectively 6 for the demodulation) (both figures shown below) are as follows:

- The step of "multiplication by  $e^{j\frac{\pi}{2}n}$  of each of said source data, providing multiplied source data" of claim 4 corresponds substantially to the example equation (60) of the description,

which is the first equation of claim 5, and as a result the “source data” and “the multiplied source data” correspond respectively to  $a_{m,n}$  and  $x_m^n(n)$ .

- The steps of “applying a predetermined phase shift to each source data of a set of 2M multiplied source data, wherein said predetermined phase shift is  $D = \alpha M - \beta$ , with  $\alpha$  an integer representing a reconstruction delay and  $\beta$  an integer between 0 and  $M-1$ ” and the step performing the reverse Fourier transform fed by the set of 2M source data having undergone the predetermined phase shift, of claim 4 corresponds substantially to the example equations (61) and (62) of the description, which is the second equation of claim 5, and corresponds also to the step referenced 51 in figure 5.
- The steps of “feeding 2M synthesis filters with outputs of said reverse Fourier transform”, and of “expansion of order M of outputs of said synthesis filters, providing outputs”, of claim 4 corresponds substantially to the example equation (63) of the description, which is the third equation of claim 5.
- The steps of “grouping said outputs”, and “transmitting the grouped outputs” of claim 4 corresponds substantially to the example equation (64) of the description, which is the fourth equation of claim 5.

For at least the above-reasons, Applicant believes the proposed amended claims (as well as their prior versions) are patentable. Applicant therefore respectfully requests that the amendments be entered and the claim rejections be withdrawn.

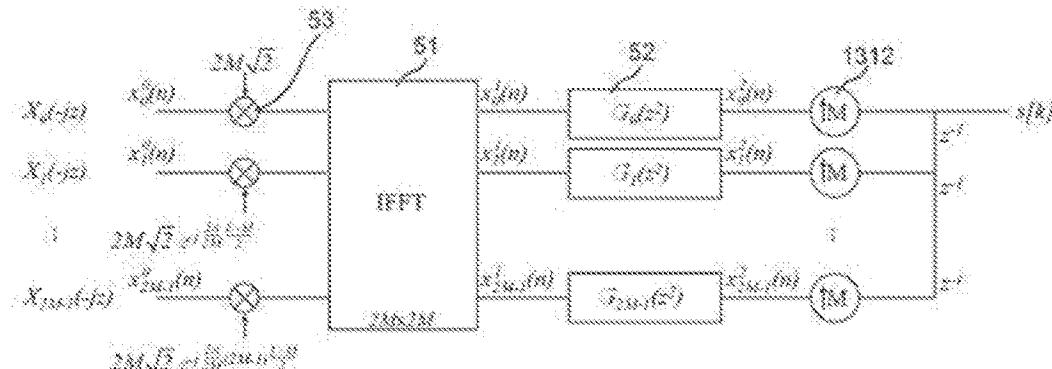


Fig. 5

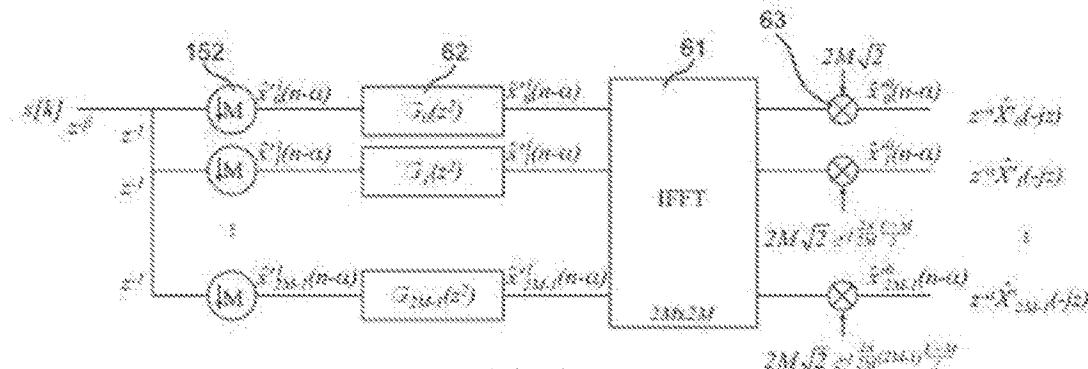


Fig. 6

### III. CONCLUSION

The foregoing remarks are intended to assist the Office in examining the application and in the course of explanation may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered exhaustive of the facets of the invention which are rendered patentable, being only examples of certain advantageous features and differences, which Applicants' attorney chooses to mention at this time. For the foregoing reasons, Applicants reserve the right to submit additional evidence showing the distinction between Applicants' invention to be unobvious in view of the prior art.

Furthermore, in commenting on the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between the same and the present invention have been mentioned, even though such differences do not appear in all of the claims. It is not intended by mentioning any such

unclaimed distinctions to create any implied limitations in the claims.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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